PATENT ABSTRACTS OF JAPAN

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(21)Application number : 11-283187 (71)Applicant : TOSHIBA CORP

(22)Date of filing : 04.10.1999 (72)Inventor : KURODA YASUSHI

(54) SURFACE ACOUSTIC WAVE DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a surface acoustic wave device in which a frequency temperature coefficient can be reduced, and the deterioration of an insertion loss can be reduced.

SOLUTION: In a surface acoustic wave device 1, a surface acoustic wave element 3 made of aluminum of a resonance type filter with a 900 MHz band is formed on a piezoelectric substrate 2 made of 36° Y-X LiTaO3. An insulating film 19 made of SiO2 is coated on the surface of the piezoelectric substrate 2 other than the surfaces of excitation electrode parts 4 and 11, electrode pad parts 7 and 15, and a reflector 18 of the surface acoustic wave element 3.

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CLAIMS

[Claim(s)]

[Claim 1] Surface acoustic wave equipment characterized by providing a piezoelectric substrate, the surface acoustic element formed on this piezoelectric substrate, and the insulating film of a coefficient of thermal expansion smaller than the piezoelectric substrate which is formed thinly and covers this surface acoustic element and the surrounding piezoelectric substrate of this surface acoustic element on [some / at least] this surface acoustic element.

[Claim 2] Surface acoustic wave equipment characterized by providing a piezoelectric substrate, the surface acoustic element formed on this piezoelectric substrate, and the insulating film of a coefficient of thermal expansion smaller than the piezoelectric substrate which is removed and covers this surface acoustic element and the surrounding piezoelectric substrate of this surface acoustic element on [some / at least] this surface acoustic element.

[Claim 3] a piezoelectric substrate -- 36-degreeY-X LiTaO3 it is -- surface acoustic wave equipment according to claim 1 or 2 characterized by things.

[Claim 4] the insulating film -- SiO2 claim 1 characterized by being SiON thru/or 3 -- either -- surface acoustic wave equipment of a publication. [or]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the surface acoustic wave equipment which suppressed aggravation of an insertion loss, making a frequency temperature coefficient low.

[0002]

[Description of the Prior Art] Especially surface acoustic wave equipment is used for mobile communications, such as a cellular phone which needs a miniaturization, in recent years.

[0003] For example, in the cellular phone, surface acoustic wave equipment is used in if filter between the preceding paragraph of the duplexer in the part which distributes a signal to an antenna from the receiving stage from an antenna, and a transmitting stage, and the amplifier of a receiving side, the latter part, a local oscillator, and a mixer, and behind a mixer, the transmitting stage, etc.

[0004] With the surface acoustic wave filter using the surface acoustic wave equipment used with a RF (RF) band among these, a ladder type filter, a mode coupling mold filter, etc. are used from a viewpoint of the low loss required of mobile communications in many cases. Moreover, there is much what assigns 60MHz - 75MHz to transmission and reception 25MHz - 35MHz and near 1.8GHz by 800MHz - 900MHz as a system use frequency, and the comparatively large passband is demanded.

[0005] Moreover, the bandwidth of a surface acoustic wave filter is 64-degreeY-X, in order to be greatly dependent on the electrical coupling multiplier of the

piezoelectric substrate to be used. LiNbO3 36-degreeY-X LiTaO3 is used abundantly.

[0006] And a transmitting band and a receiving band set spacing of about 20MHz, and adjoin, and it is usually required that the surface acoustic wave filter used for each band should make other bands an inhibition zone. For this reason, when the own passage property of a surface acoustic wave filter considers it not only having steep frequency characteristics, but it being used in the temperature requirement where a cellular phone etc. is to some extent large, and getting to a nearby inhibition zone, it is desirable to use a piezoelectric substrate with a small frequency temperature coefficient (Temperature CoefficientFrequency).

[0007] In addition, 36-degreeY-X LiTaO3 The way is 64-degreeY-X. LiNbO3 Being used mostly is 36-degreeY-X, although an electromechanical coupling coefficient is small. LiTaO3 It is 64-degreeY-X to being the frequency temperature coefficient which is about -35PPM/degree C. LiNbO3 It is because it is a big frequency temperature coefficient in degree C and -70PPM /.

[0008] Moreover, 36-degreeY-X LiTaO3 64-degreeY-X LiNbO3 If it compares, although it has a good frequency temperature coefficient, since 8MHz extent is still needed, for example when it counts upon those with 20MHz, and temperature fluctuation between the transceiver bands of PCS, it is a big value. That is, the frequency characteristics which change to a high decay area required for an inhibition zone are needed from a low loss frequency required for a passband at 12MHz, and considering that the system of PCS is in about 1.9GHz, very steep frequency characteristics are required.

[0009]

[Problem(s) to be Solved by the Invention] Then, for example, 36-degreeY-X LiTaO3 It is SiO2 on a piezoelectric substrate. The film is formed, namely, it is about 30% of SiO2 at H/close one. 36-degreeY-X Although it is possible to form on LiTaO3, in the case of the filter of a 800MHz band, it is about 1.2-micrometer SiO2, for example. It is necessary to give the thickness of a layer and is accompanied by the fall of an electromechanical coupling factor, and aggravation

of an insertion loss.

[0010] Moreover, 36-degreeY-X thin as other approaches LiTaO3 Making a frequency temperature coefficient small is also considered by sticking a piezoelectric substrate with a glass substrate. In this case, 36-degreeY-X LiTaO3 Although insertion-loss aggravation etc. is not produced since nothing is formed in the top face by the side of the electrode forming face of a piezoelectric substrate 36-degreeY-X LiTaO3 It is necessary to change thickness with the frequency band, and is comparatively thin 36-degreeY-XLiTaO3. While slicing a substrate An adhesion process with a glass substrate is needed, and it has the problem accompanied by the complicatedness on production processes, such as difficulty of blade selection which cuts a piezoelectric substrate and a glass substrate.

[0011] This invention was made in view of the above-mentioned trouble, and it aims at offering the surface acoustic wave equipment which suppressed aggravation of an insertion loss, making a frequency temperature coefficient low.

[0012]

[Means for Solving the Problem] The surface acoustic element by which this invention was formed on a piezoelectric substrate and this piezoelectric substrate, It is a thing possessing the insulating film of a coefficient of thermal expansion smaller than the piezoelectric substrate which is formed thinly and covers this surface acoustic element and the surrounding piezoelectric substrate of this surface acoustic element on [some / at least] this surface acoustic element. Since it is hard to have a bad influence by making thin a surface acoustic element and the insulating film of this surface acoustic element circumference on the surface acoustic element accompanying thermal expansion etc., Since aggravation of loss by insertion can be prevented and there is insulating film of the coefficient of thermal expansion smaller than a piezoelectric substrate in addition to a surface acoustic element and this surface acoustic element circumference, the fall of the frequency temperature characteristic is also prevented.

[0013] Moreover, the surface acoustic element by which this invention was formed on a piezoelectric substrate and this piezoelectric substrate, It is a thing possessing the insulating film of a coefficient of thermal expansion smaller than the piezoelectric substrate which is removed and covers this surface acoustic element and the surrounding piezoelectric substrate of this surface acoustic element on [some / at least] this surface acoustic element. Since it is hard to have a bad influence by removing a surface acoustic element and the insulating film of this surface acoustic element circumference on the surface acoustic element accompanying thermal expansion etc., Since aggravation of loss by insertion can be prevented and there is insulating film of the coefficient of thermal expansion smaller than a piezoelectric substrate in addition to a surface acoustic element and this surface acoustic element circumference, the fall of the frequency temperature characteristic is also prevented.

[0014] moreover, a piezoelectric substrate -- 36-degreeY-X LiTaO3 it is -- it is a thing, and since the frequency temperature coefficient is good, the frequency temperature characteristic becomes good.

[0015] Furthermore, the insulating film is SiO2. Or it is SiON, and since the coefficient of thermal expansion is small, the frequency temperature characteristic is made good.

[0016]

[Embodiment of the Invention] Hereafter, the gestalt of 1 operation of the surface acoustic wave equipment of this invention is explained with reference to a drawing.

[0017] As shown in drawing, surface acoustic wave equipment 1 is 36-degreeY-X. LiTaO3 On the piezoelectric substrate 2, the surface acoustic element 3 of the aluminum (aluminum) of the resonance mold filter of a 900MHz band is formed.

[0018] This surface acoustic element 3 has in serial the excitation polar zone 4 which has a function as Inter Digital Transducer, the ctenidium-like electrode 6 with which two or more formation of the electrode finger 5 was carried out counters at a tip, these excitation polar zone 4 is formed in it, and the electrode

pad section 7 is formed in this ctenidium-like electrode 6 in one.

[0019] Moreover, similarly, four excitation polar zone 11 is formed, the ctenidium-like electrodes 13 and 14 with which two or more formation of the electrode finger 12 was carried out at the tip counter, are prepared, and are formed in the ctenidium-like electrode 13 in [the electrode pad section 15] one, and these next door **** electrode pad section 15 is electrically connected in the direction of an outside of each of the excitation polar zone 4 for these excitation polar zone 11 by the connection 16. Furthermore, the ctenidium-like electrode 14 is electrically connected by the ctenidium-like electrode 14 and connection 17 which are located in the opposite side.

[0020] Furthermore, the excitation polar zone 11 is made to adjoin and the reflector 18 is formed, respectively.

[0021] Moreover, in the front face of the excitation polar zone 4 and 11 of these surface acoustic elements 3, the electrode pad sections 7 and 15, and the piezoelectric substrate 2 except the front face of a reflector 18, it is SiO2. Covering formation of the insulating film 19 is carried out.

[0022] Next, the manufacture approach of the above-mentioned surface acoustic wave equipment 1 is explained.

[0023] First, 36-degreeY-X LiTaO3 On the piezoelectric substrate 2, lambda= 4.4 micrometers and thickness form the aluminum (aluminum) which is 3700A, and carry out pattern formation of the surface acoustic element 3.

[0024] Next, it is SiO2 on the piezoelectric substrate 2 containing this surface acoustic element 3. By chemistry dry etching (Chemical Dry Etching), as about 2 micrometers forms membranes and the insulating film 19 is shown in drawing 2 , the insulating film 19 on the excitation polar zone 4 and 11, the electrode pad sections 7 and 15, and a reflector 18 is removed.

[0025] And 36-degreeY-X LiTaO3 SiO2 on the piezoelectric substrate 2 The insulating film 19 is about 50% of H/lambda, and is usual 36-degreeY-X. LiTaO3 It is the value used for temperature compensation. While decreasing an electromechanical coupling coefficient because only the excitation polar zone 4

and 11 and reflector 18 of small area in connection with excitation and reception remove this insulating film 19, aggravation of an insertion loss is controlled. Compared with the case where the part which removed this insulating film 19 does not form the part which removes the temperature change of coefficient of linear expansion and an elastic coefficient on the insulating film 19 on the piezoelectric substrate 2 in order to receive a perturbation with the surrounding insulating film 19, either, a frequency temperature coefficient moves in the small direction.

[0026] Moreover, bonding also becomes easy by removing the electrode pad section 7 and the insulating film 19 on 15.

[0027] Next, the gestalt of other operations is explained with reference to drawing 3 .

[0028] In the surface acoustic wave equipment 1 shown in drawing 1 and drawing 2 , the surface acoustic wave equipment 1 shown in this drawing 3 did not perform aperture dawn removal of the insulating film 19 completely by chemistry dry etching, but has stopped the insulating film 19 on the excitation polar zone 4 and 11, the electrode pad sections 7 and 15, and a reflector 18 by **** which remained by making it about 400A thinness.

[0029] Thus, the short circuit prevention effectiveness by the conductive foreign matter by the insulating film 19 is not spoiled except that the temperature-compensation effectiveness can be held by leaving the insulating film 19 thinly. Moreover, although the insulating film 19 remains thinly on the electrode pad section 7 and 15, at the time of the aluminum-US bonding of the aluminum wire which is not illustrated, this thin insulating film 19 is destroyed and contact in an aluminum wire and the electrode pad sections 7 and 15 is obtained.

[0030]

[Effect of the Invention] Since it is hard to have a bad influence by removing thinly a surface acoustic element and the insulating film of this surface acoustic element circumference on the surface acoustic element accompanying thermal expansion etc. according to this invention, and aggravation of loss by insertion

can be prevented and there is insulating film of the coefficient of thermal expansion smaller than a piezoelectric substrate in addition to a surface acoustic element and this surface acoustic element circumference, the fall of the frequency temperature characteristic can also be prevented.

[Translation done.]

* NOTICES *

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the top view showing the gestalt of 1 operation of the surface acoustic wave equipment of this invention.

[Drawing 2] It is the sectional view showing the same as the above part.

[Drawing 3] It is the sectional view showing a part of gestalt of operation of others [same as the above].

[Description of Notations]

1 Surface Acoustic Wave Equipment

2 Piezoelectric Substrate

3 Surface Acoustic Element

19 Insulating Film

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* NOTICES *

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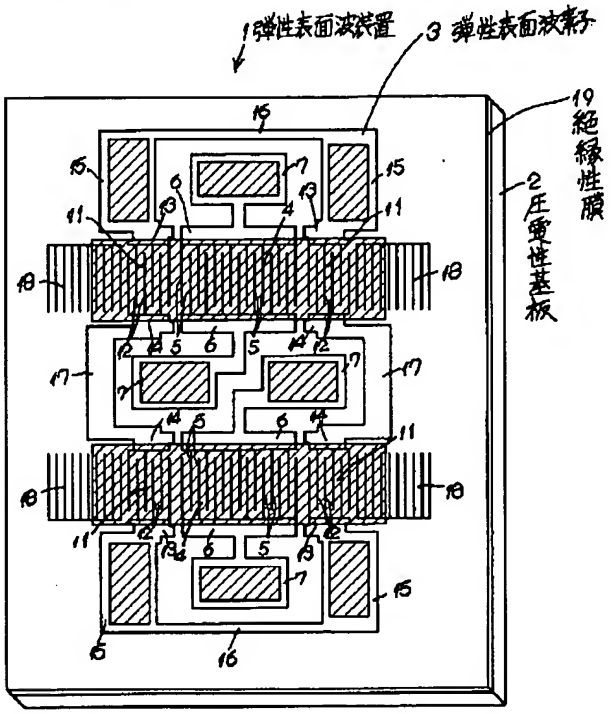
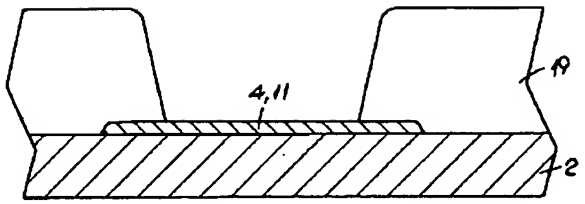
DRAWINGS

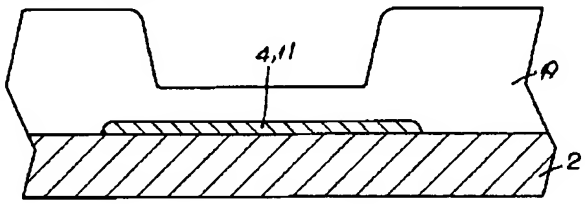
[Drawing 1]



[Drawing 2]



[Drawing 3]



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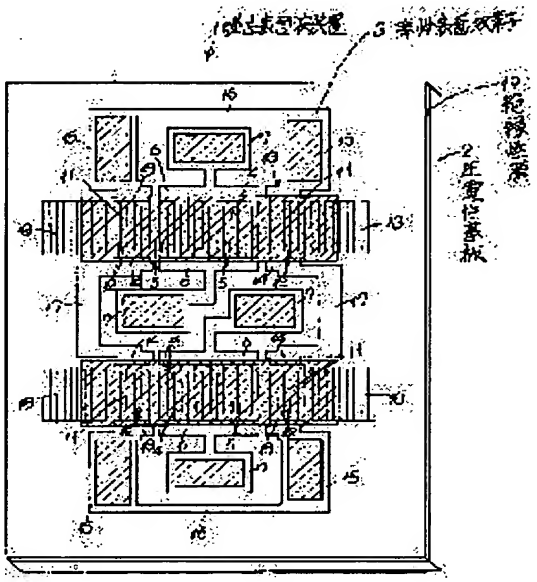

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9/145		9/145	Ｚ	

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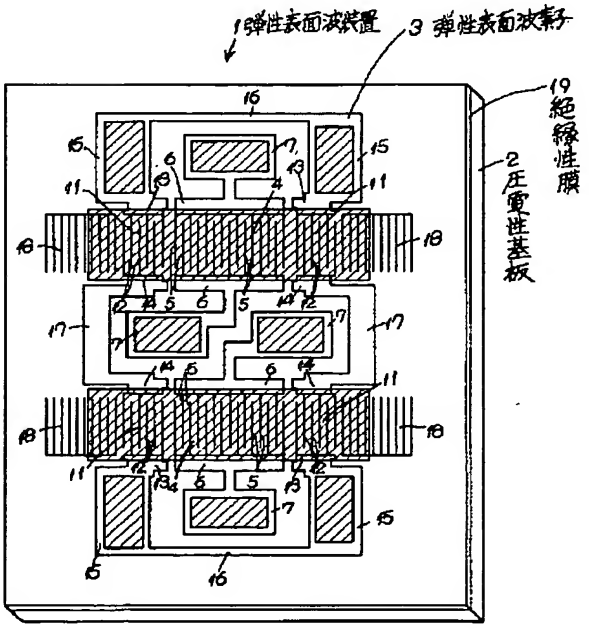
Ｆターム(参考)　5J097 AA01 AA21 AA26 BB03 BB11 CC02 DD25 DD29 FF05 GG03 GG05 KK09

(54)【発明の名称】弾性表面波装置

(57)【要約】
【課題】　周波数温度係数を低くしつつ挿入損失の悪化を抑えた弾性表面波装置を提供する。
【解決手段】　弾性表面波装置１は、３６°Ｙ－Ｘ　ＬｉＴａO_3 の圧電性基板２上に、９００ＭＨｚ帯の共振型フィルタのアルミニウムの弾性表面波素子３を形成する。弾性表面波素子３の励振電極部４，11、電極パッド部７，15および反射器18の表面を除いた圧電性基板２の表面に、ＳｉO_2 の絶縁性膜19を被覆形成する。



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【特許請求の範囲】

【請求項１】　圧電性基板と、

この圧電性基板上に形成された弾性表面波素子と、

この弾性表面波素子の少なくとも一部の上では薄く形成されこの弾性表面波素子およびこの弾性表面波素子の周辺の圧電性基板を被覆する圧電性基板より小さな熱膨張係数の絶縁性膜とを具備したことを特徴とする弾性表面波装置。

【請求項２】　圧電性基板と、

この圧電性基板上に形成された弾性表面波素子と、

この弾性表面波素子の少なくとも一部の上では除去されこの弾性表面波素子およびこの弾性表面波素子の周辺の圧電性基板を被覆する圧電性基板より小さな熱膨張係数の絶縁性膜とを具備したことを特徴とする弾性表面波装置。

【請求項３】　圧電性基板は、３６°Ｙ－Ｘ　ＬｉＴａO_3 であることを特徴とする請求項１または２記載の弾性表面波装置。

【請求項４】　絶縁性膜は、SiO_2 もしくはＳｉＯＮであることを特徴とする請求項１ないし３いずれか記載の弾性表面波装置。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】本発明は、周波数温度係数を低くしつつ挿入損失の悪化を抑えた弾性表面波装置に関する。

【０００２】

【従来の技術】弾性表面波装置は、近年、特に小型化を必要とする携帯電話などの移動体通信に用いられている。

【０００３】たとえば携帯電話では、アンテナからの受信段、送信段からアンテナに信号を分配する個所でのデュプレクサ、受信側のアンプの前段、後段、局部発振器とミキサ間、ミキサ後のｉｆフィルタ、送信段などで弾性表面波装置が用いられている。

【０００４】これらのうち高周波（ＲＦ）帯で用いられる弾性表面波装置を用いた弾性表面波フィルタでは、移動体通信に要求される低損失という観点から、梯子型フィルタ、モード結合型フィルタなどが用いられることが多い。また、システムの使用周波数として８００ＭＨｚ～９００ＭＨｚで２５ＭＨｚ～３５ＭＨｚ、１．８ＧＨｚ付近では６０ＭＨｚ～７５ＭＨｚを送信、受信に割り当てるものが多く、比較的広い通過帯域が要求されている。

【０００５】また、弾性表面波フィルタの帯域幅は用いる圧電性基板の電気的結合係数に大きく依存するため、６４°Ｙ－Ｘ　ＬｉＮｂO_3 や３６°Ｙ－Ｘ　ＬｉＴａO_3が多用されている。

【０００６】そして、通常、送信帯と受信帯は２０ＭＨｚ程度の間隔をおいて隣接しており、それぞれの帯域に

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用いられる弾性表面波フィルタは他の帯域を阻止域とすることが要求される。このため弾性表面波フィルタ自身の通過特性が近傍の阻止域に対して急峻な周波数特性を有するのみならず、携帯電話などがある程度広い温度範囲で使用されうることを考えると周波数温度係数（Temperature CoefficientFrequency）の小さい圧電性基板を用いることが望ましい。

【０００７】なお、３６°Ｙ－Ｘ　ＬｉＴａO_3 のほうが６４°Ｙ－Ｘ　ＬｉＮｂO_3 よりも多く利用されているのは、電気機械結合係数が小さいにもかかわらず３６°Ｙ－Ｘ　ＬｉＴａO_3 が－３５ＰＰＭ／℃程度の周波数温度係数なのに対し、６４°Ｙ－Ｘ　ＬｉＮｂO_3 が－７０ＰＰＭ／℃と大きな周波数温度係数であることによる。

【０００８】また、３６°Ｙ－Ｘ　ＬｉＴａO_3 は、６４°Ｙ－Ｘ　ＬｉＮｂO_3 と比較しては良好な周波数温度係数を有するものの、それでもたとえばＰＣＳの送受信帯域間は２０ＭＨｚあり、温度変動を見込むと８ＭＨｚ程度は必要になるので大きな値である。すなわち、１２ＭＨｚで通過帯域に必要な低損失な周波数から阻止域に必要な高減衰領域に遷移する周波数特性が必要となり、ＰＣＳのシステムが１．９ＧＨｚ近傍にあることを考えると、非常に急峻な周波数特性が要求される。

【０００９】

【発明が解決しようとする課題】そこで、たとえば３６°Ｙ－Ｘ　ＬｉＴａO_3 の圧電性基板上にSiO_2 膜を形成し、すなわちＨ／入で３０％程度のSiO_2 を３６°Ｙ－Ｘ　ＬｉＴａO_3上に形成することが考えられるが、たとえば８００ＭＨｚ帯のフィルタの場合、１．２μｍ程度のSiO_2 層の厚さを持たせる必要があり、電気機械結合定数の低下、挿入損失の悪化を伴なう。

【００１０】また、他の方法として薄い３６°Ｙ－Ｘ　ＬｉＴａO_3 の圧電性基板をガラス基板と貼り合わせることにより周波数温度係数を小さくすることも考えられる。この場合は３６°Ｙ－Ｘ　ＬｉＴａO_3 の圧電性基板の電極形成面側の上面に何も形成されていないので挿入損失悪化などは生じないが、３６°Ｙ－Ｘ　ＬｉＴａO_3 の厚さをその周波数帯により変える必要があり、比較的薄い３６°Ｙ－ＸＬｉＴａO_3 基板をスライスする必要があるとともに、ガラス基板との接着工程が必要になり、圧電性基板およびガラス基板を切断するブレード選定の難しさなど製造工程上の繁雑さを伴なってしまう問題を有している。

【００１１】本発明は、上記問題点に鑑みなされたもので、周波数温度係数を低くしつつ挿入損失の悪化を抑えた弾性表面波装置を提供することを目的とする。

【００１２】

【課題を解決するための手段】本発明は、圧電性基板と、この圧電性基板上に形成された弾性表面波素子と、この弾性表面波素子の少なくとも一部の上では薄く形成

されこの弾性表面波素子およびこの弾性表面波素子の周辺の圧電性基板を被覆する圧電性基板より小さな熱膨張係数の絶縁性膜とを具備したもので、弾性表面波素子およびこの弾性表面波素子周辺の絶縁性膜を薄くすることにより、熱膨張などに伴なう弾性表面波素子に悪影響を与えにくいため、挿入による損失の悪化を防止でき、また、弾性表面波素子およびこの弾性表面波素子周辺以外には圧電性基板より小さな熱膨張係数の絶縁性膜があるので周波数温度特性の低下も防止する。

【００１３】また、本発明は、圧電性基板と、この圧電性基板上に形成された弾性表面波素子と、この弾性表面波素子の少なくとも一部の上では除去されこの弾性表面波素子およびこの弾性表面波素子の周辺の圧電性基板を被覆する圧電性基板より小さな熱膨張係数の絶縁性膜とを具備したもので、弾性表面波素子およびこの弾性表面波素子周辺の絶縁性膜を除去することにより、熱膨張などに伴なう弾性表面波素子に悪影響を与えにくいため、挿入による損失の悪化を防止でき、また、弾性表面波素子およびこの弾性表面波素子周辺以外には圧電性基板より小さな熱膨張係数の絶縁性膜があるので周波数温度特性の低下も防止する。

【００１４】また、圧電性基板は、３６°Ｙ－Ｘ　$LiTaO_3$ であるもので、周波数温度係数が良好であるため、周波数温度特性が良好になる。

【００１５】さらに、絶縁性膜は、SiO_2 もしくはＳｉＯＮであるもので、熱膨張係数が小さいため、周波数温度特性を良好にする。

【００１６】

【発明の実施の形態】以下、本発明の弾性表面波装置の一実施の形態を図面を参照して説明する。

【００１７】図に示すように、弾性表面波装置１は、３６°Ｙ－Ｘ　$LiTaO_3$ の圧電性基板２上に、９００ＭＨｚ帯の共振型フィルタのアルミニウム（Ａｌ）の弾性表面波素子３が形成されている。

【００１８】この弾性表面波素子３は、Inter Digital Transducerとしての機能を有する励振電極部４を直列的に有し、これら励振電極部４は先端に電極指５が複数形成された櫛歯状電極６が対向して設けられ、この櫛歯状電極６には電極パッド部７が一体的に形成されている。

【００１９】また、励振電極部４のそれぞれの外側方向には、同様に、励振電極部11が４ヶ所形成され、これら励振電極部11は先端に電極指12が複数形成された櫛歯状電極13，14が対向して設けられ、櫛歯状電極13には電極パッド部15が一体的に形成され、これら隣り合う電極パッド部15は接続部16により電気的に接続されている。さらに、櫛歯状電極14は反対側に位置する櫛歯状電極14と接続部17により電気的に接続されている。

【００２０】またさらに、励振電極部11に隣り合わせて、それぞれ反射器18が形成されている。

【００２１】また、これら弾性表面波素子３の励振電極部４，11、電極パッド部７，15および反射器18の表面を除いた圧電性基板２の表面には、SiO_2 の絶縁性膜19が被覆形成されている。

【００２２】次に、上記弾性表面波装置１の製造方法について説明する。

【００２３】まず、３６°Ｙ－Ｘ　$LiTaO_3$ の圧電性基板２上に、λ＝４．４μｍ、膜厚が３７００オングストロームのアルミニウム（Ａｌ）を形成し、弾性表面波素子３をパターン形成する。

【００２４】次に、この弾性表面波素子３を含む圧電性基板２上にSiO_2 の絶縁性膜19を約２μｍ成膜し、化学ドライエッチング（Chemical Dry Etching）で、図２に示すように、励振電極部４，11、電極パッド部７，15および反射器18上の絶縁性膜19を除去する。

【００２５】そして、３６°Ｙ－Ｘ　$LiTaO_3$ の圧電性基板２上のSiO_2 の絶縁性膜19は約５０％のＨ／λであり、通常の３６°Ｙ－Ｘ　$LiTaO_3$ での温度補償に用いられる値である。この絶縁性膜19を励振、受信に関わる小面積の励振電極部４，11および反射器18のみ除去する事で電気機械結合係数を減少させるとともに、挿入損失の悪化を抑制する。この絶縁性膜19を除去した部分も周囲の絶縁性膜19により線膨張率および弾性定数の温度変化は摂動をうけるため、圧電性基板２上の絶縁性膜19に除去する部分を形成しない場合に比べ、周波数温度係数は小さい方向に動く。

【００２６】また、電極パッド部７，15上の絶縁性膜19を除去することにより、ボンディングも容易になる。

【００２７】次に、他の実施の形態を図３を参照して説明する。

【００２８】この図３に示す弾性表面波装置１は、図１および図２に示す弾性表面波装置１において、化学ドライエッチングで絶縁性膜19の窓明け除去を完全には行なわず、励振電極部４，11、電極パッド部７，15および反射器18上の絶縁性膜19を約４００オングストロームの薄さにして残った段階で止めている。

【００２９】このように、絶縁性膜19を薄く残すことにより、温度補償効果を保持できる他、絶縁性膜19による導伝性異物による短絡防止効果を損なわない。また、電極パッド部７，15上に薄く絶縁性膜19は残るが、図示しないアルミニウムワイヤのＡｌ－ＵＳボンディング時にこの薄い絶縁性膜19は破壊され、アルミニウムワイヤと電極パッド部７，15とのコンタクトは得られる。

【００３０】

【発明の効果】本発明によれば、弾性表面波素子およびこの弾性表面波素子周辺の絶縁性膜を薄くあるいは除去することにより、熱膨張などに伴なう弾性表面波素子に悪影響を与えにくいため、挿入による損失の悪化を防止でき、また、弾性表面波素子およびこの弾性表面波素子周辺以外には圧電性基板より小さな熱膨張係数の絶縁性膜があるので周波数温度特性の低下も防止できる。

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【図面の簡単な説明】

【図１】本発明の弾性表面波装置の一実施の形態を示す平面図である。

【図２】同上一部を示す断面図である。

【図３】同上他の実施の形態の一部を示す断面図である。

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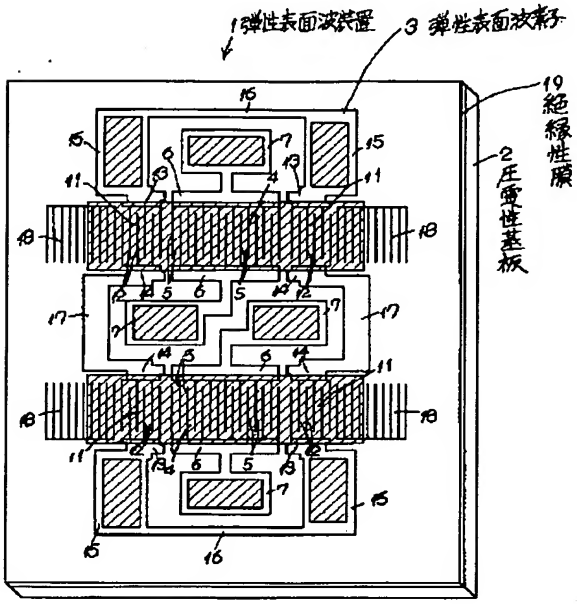
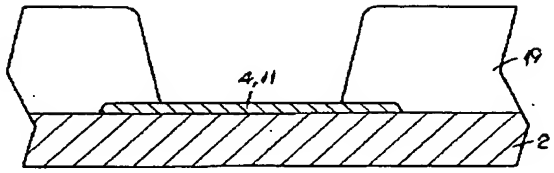
【符号の説明】

1　弾性表面波装置
2　圧電性基板
3　弾性表面波素子
19　絶縁性膜

【図１】



【図２】



【図３】